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Idaho Operations Office

Scope of Work for Waste Area Group 10 Track 2 Investigations for Sites CFA-54, MISC-45, and TRA-62

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**Scope of Work for Waste Area Group 10
Track 2 Investigations for Sites CFA-54, MISC-45,
and TRA-62**

March 2005

**Prepared for the
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Idaho Operations Office**

ABSTRACT

This scope of work addresses the Track 2 field investigation of three Comprehensive Environmental Response, Compensation, and Liability Act sites included in Waste Area Group 10 at the Idaho National Laboratory. Sites being investigated in this study consist of the buried waste pipe south of Building CFA-674 (Site CFA-54), the dirt pile with naval smoke cans near the Idaho Nuclear Technology and Engineering Center (Site MISC-45), and the abandoned discharge pipeline between Building TRA-608 and the TRA-701 chemical waste pond (Site TRA-62). This document summarizes previous studies and presents preliminary scoping recommendations and preliminary site conceptual models that illustrate the potential contaminant pathways to environmental receptors. Also presented are the preliminary data quality objectives for this Track 2 investigation, a list of deliverables, and the project schedule.

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ACRONYMS

CFA	Central Facilities Area
COPC	contaminant of potential concern
DEQ	Department of Environmental Quality
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
FSP	field sampling plan
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
OU	operable unit
RI/FS	remedial investigation/feasibility study
SOW	scope of work
TRA	Test Reactor Area
WAG	waste area group

Scope of Work for Waste Area Group 10 Track 2 Investigations for Sites CFA-54, MISC-45, and TRA-62

1. INTRODUCTION

This scope of work (SOW) addresses three Comprehensive Environmental Response, Compensation, and Liability Act sites within Waste Area Group (WAG) 10 at the Idaho National Laboratory (INL). These sites consist of the following:

- The buried waste pipe south of the Central Facilities Area (CFA)-674 building (Site CFA-54)
- The dirt pile with naval smoke cans near the Idaho Nuclear Technology and Engineering Center (INTEC) (Site MISC-45)
- The abandoned discharge pipeline between the Test Reactor Area (TRA)-608 building and the TRA-701 chemical waste pond (Site TRA-62).

These sites are being addressed under an INL Track 2 investigation. The purpose of the investigation is to provide additional data for the WAG 10 Operable Unit (OU) 10-08 remedial investigation/feasibility study (RI/FS). This SOW is written in accordance with *Track 2 Sites: Guidance for Assessing the Low Probability Hazard Sites at the INEL* (DOE-ID 1994).

2. SITE HISTORY AND BACKGROUND

This section presents the background of each site in this investigation, including the results and recommendations of the Track 1 investigations.

2.1 Site CFA-54: Buried Waste Pipe South of Building CFA-674

Site CFA-54 consists of a 6-in. clay pipeline buried approximately 6 ft below ground surface and used to carry waste approximately 400 ft from the Chemical Engineering Laboratory in Building CFA-674 to the CFA-04 pond (Figure 1). The pipeline was used from 1953 to 1969. Building CFA-674 was used to support activities associated with the development and testing of a nuclear waste calcining process on simulated (no fuel) nuclear fuel rods. The two primary waste streams that were discharged through the pipe included mercury-contaminated calcine and the liquid effluent from laboratory experiments.

Sampling has not been performed specifically to evaluate the CFA-54 site, but analytical results of samples collected at the CFA-04 pond site in 1994, 1995, and 1998 were used during the comprehensive RI/FS for CFA OU 4-13 (DOE-ID 2000) in order to characterize the nature and extent of contamination in the pond. The pipe was recognized and associated with the pond but was not officially added to the pond description in the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991), so remedial actions conducted for the pond in 2003 included no actions for the pipe area.

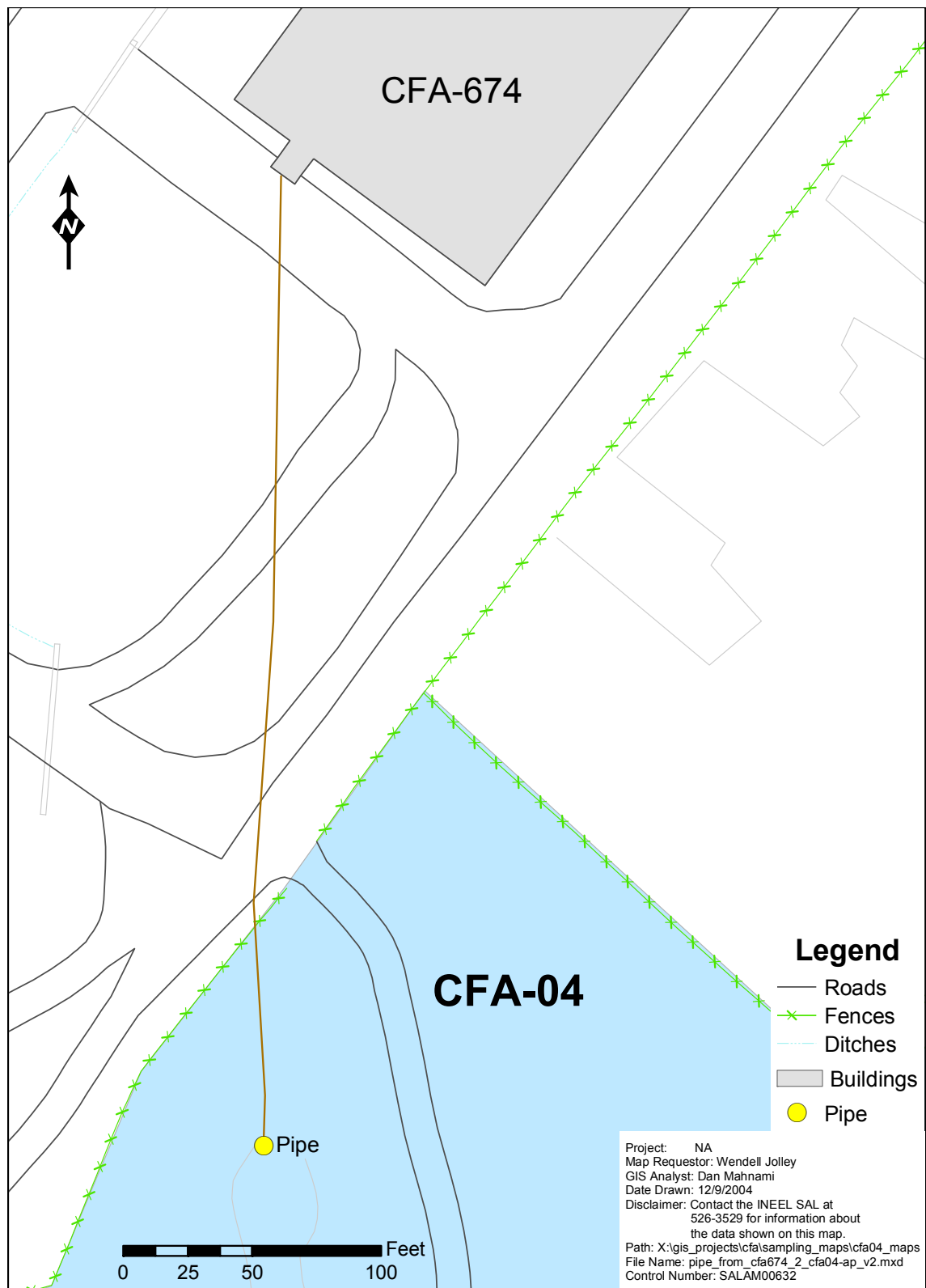


Figure 1. Location of the buried waste pipe south of CFA-674 (Site CFA-54).

Analysis of the samples taken from the pond identified aroclor-1254, arsenic, Cs-137, mercury, U-234, U-235, and U-238 as contaminants of potential concern (COPCs). The RI/FS evaluated the CFA-04 pond and recommended excavation of the pond's contaminated soil. Because the opening of the pipe was unearthed during remedial activities, samples were also collected from the sludge within the pipe, the soil directly beneath the opening of the pipe, and two additional locations along the pipe. Sample analysis of the sludge revealed the presence of mercury at a concentration of 61 mg/kg. The soil directly beneath the pipe opening contained mercury at a concentration of 34 mg/kg. No soil contamination was detected in the soil beneath the pipe at a point 95 ft from the opening of the pipe toward the building. However, mercury was present at a concentration of 73 mg/kg in a sample 205 ft from the opening of the pipe toward the building.

A New Site Identification Form was completed for this site and submitted on May 18, 2004, to the Idaho Department of Environmental Quality (DEQ) and the U.S. Environmental Protection Agency (EPA) for review. Based on mercury concentrations in the soil surrounding the pipe, the regulatory agencies (i.e., the U.S. Department of Energy, the Idaho DEQ, and the EPA) recommended that the site be carried forward to a Track 2 and sampling be conducted. A Track 1 investigation has not been conducted at this site.

2.2 Site MISC-45: Dirt Pile with Naval Smoke Cans near INTEC

Site MISC-45, located approximately 1 mi north of INTEC near the intersection of the Big Lost River and the railroad tracks (Figure 2), consists of several empty 5-gal canisters labeled "Smoke, Pot, Floating, HC-M4A2" scattered at the base of an earthen mound. Smoke pots similar to these were typically used to create smoke screens during U.S. Naval training activities at the INL site in the post-World War II era. Historical information revealed the smoke pots contained Type C hexachloroethane, zinc oxide, and grained aluminum. Metal by-product compounds potentially formed in the hexachloroethane smoke emission include zinc chloride, ammonium chloride, cadmium chloride, lead chloride, arsenic (chlorides and oxides), and aluminum oxide. The smoke pot canisters are empty, no residual material is evident on the ground surface, and the vegetation surrounding the smoke pot canisters is healthy and well established, giving no indication of contaminant migration.

The origin of the earthen mound is unknown. It is approximately 15 to 20 ft long, 10 ft wide, 8 ft high, and resembles dirt piles found elsewhere across the INL site. A New Site Identification Form (Burns 2000) was prepared for the MISC-45 site in 2000, placing the site in OU 10-08. The subsequent Track 1 decision documentation package (DOE-ID 2002) discusses COPCs and recommends that the site proceed to a Track 2 investigation to ascertain the extent and concentration of potential contamination. Supporting information from the Track 1 indicated that several other dirt piles are located in the area. One of the piles was found to have a concrete flap toward the bottom, possibly indicating a vault of some type. The pile with the concrete flap was incorrectly identified in the Track 1 decision document as the dirt pile at Site MISC-45. However, more a recent examination revealed that the pile at MISC-45 does not have a concrete flap at the bottom and is similar to numerous other dirt piles across the INL site that have been determined to be piles of dirt excavated by backhoes. Consequently, there is no evidence to support the theory that the dirt pile at MISC-45 was used as a vault.

There is no visual evidence of buried objects within the pile, but vegetation on it is sparse. No field screening has been conducted, and no sample data have been collected for this site. Consequently, the risk to human health or the environment is unknown, and sampling will be necessary to fully characterize this site and evaluate the risk to human health and the environment.

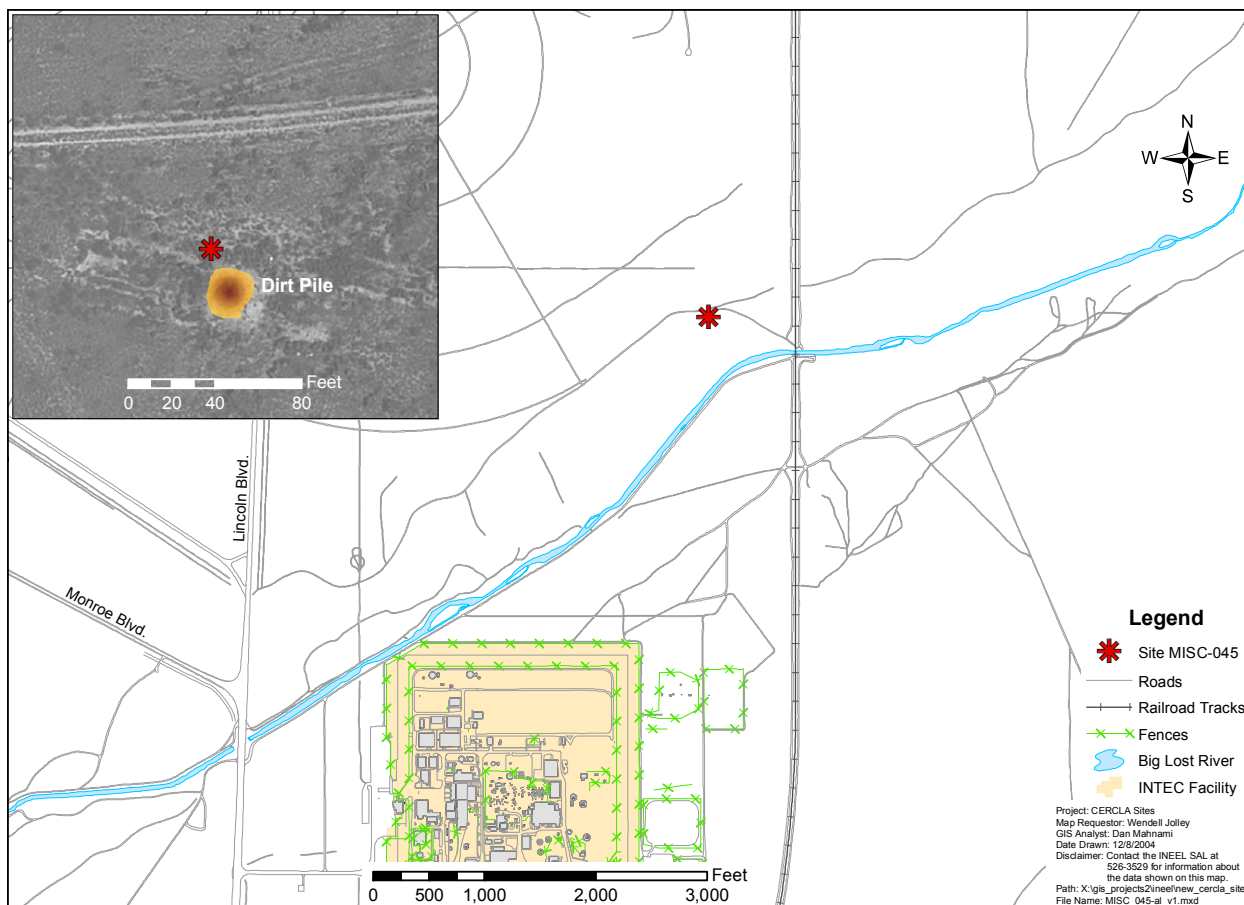


Figure 2. Location of the dirt pile with naval smoke cans near INTEC (Site MISC-45).

2.3 Site TRA-62: Abandoned Discharge Pipeline between Building TRA-608 and the TRA-701 Chemical Waste Pond

Site TRA-62 consists of a 12-in vitreous clay pipeline buried between 6 and 7 ft deep and used to transport discharge water from the TRA-608 Demineralization Building to the TRA-701 chemical waste pond (Figure 3). Discharge from this pipeline originated from effluent from collection headers on the west and southeast sides of Building TRA-608 and from the neutralization process in the TRA-631 Acid and Caustic Pump House. The pipeline comprises a single-walled vitreous clay pipe with bell and spigot joints. Generally, this type of pipeline is made up of 12-ft sections that are placed together without necessarily sealing the joints, which often resulted in leakage at the joints. Whether the sections of this particular pipeline were joined without sealing them is unknown. From 1962 to 1999, this pipeline transported between 2 million and 3 million gal of effluent annually. No samples have been collected specifically to evaluate the soil around the pipeline, but samples were collected from the soil in the chemical waste pond in 1990 and 1998. As discussed in the comprehensive remedial design/remedial action work plan for TRA OU 2-13 (DOE-ID 1998), sediments collected from the pond in 1990 were analyzed for the metals known to be constituents of the effluent that was discharged to the pond as part of the demineralization process. These metals were silver, arsenic, barium, cadmium, chromium, copper, mercury, nickel, lead, selenium, and zinc. The analytical results from the 1990 sampling indicate that only barium and mercury were present above background levels in the pond sediments. Analysis of the 1998 post ROD sampling revealed that barium and mercury were present in the pond sediments at substantial levels, and manganese, zinc, and arsenic were present at lower levels.

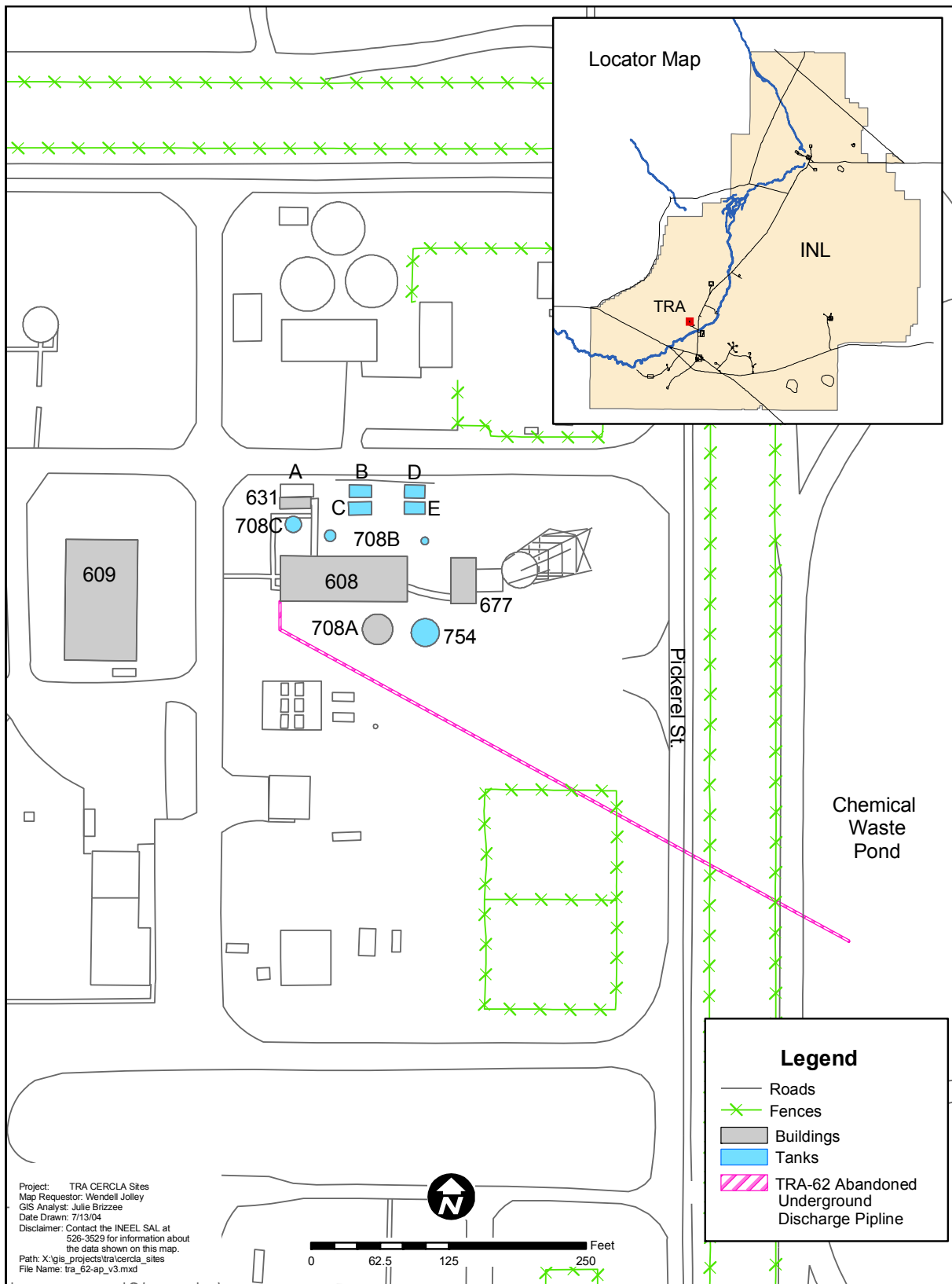


Figure 3. Abandoned discharge pipeline between Building TRA-608 and the TRA-701 chemical waste pond (Site TRA-62).

The New Site Identification Form (Wilkinson 2002) completed for this site in 2003 recommended that it be included in OU 10-08 and investigated further. The Track 1 decision documentation package (ICP 2005) recommends that this site proceed to a Track 2 investigation and that soils along the length of the pipeline be sampled for metals to evaluate the risk to human health and the environment.

3. PRELIMINARY SCOPING RECOMMENDATION

Currently, the regulatory agencies have made no preliminary scoping recommendation. The information used to develop the preliminary scope for this investigation was derived from various sources, including New Site Identification Forms, Track 1 investigation findings and recommendations, field sampling plans (FSPs), and other historical documentation.

4. SCOPE FOR WAG 10 TRACK 2 INVESTIGATION

The following subsections summarize the preliminary scope of work at each site being addressed under this Track 2 investigation. A detailed discussion of the overall sampling approach at each site are presented in the *Field Sampling Plan for Waste Area Group 10 Track 2 Investigation of Sites CFA-54, MISC-45, and TRA-62 (Draft)* (DOE-ID 2005).

4.1 CFA-54: Buried Waste Pipe south of CFA-674

Sampling has not been conducted specifically to characterize the contaminants associated with the CFA-54 pipeline. However, as presented in the RI/FS for the CFA-04 pond, sampling has been conducted in association with the remedial actions for the CFA-04 pond, which was fed by the CFA-54 pipeline. This sampling identified aroclor-1254, arsenic, mercury, Cs-137, U-234, U-235, and U-238 as COPCs in the pond.

Soil beneath the buried waste pipe will be sampled to ascertain the presence and concentration of COPCs. Before samples are collected, the ends of the pipe will be excavated, and a video camera will be run through the pipe to determine the locations of joints where leakage was most likely to have occurred. Five sample locations that coincide with the joints will be selected along the length of the pipe. Soil samples will be collected from each sample location to a maximum depth of 10 ft below ground surface. A detailed description of this sampling effort is provided in the data quality objectives (DQOs) presented in the *Field Sampling Plan for Waste Area Group 10 Track 2 Investigation of Sites CFA-54, MISC-45, and TRA-62 (Draft)* (DOE-ID 2005).

4.2 MISC-45: Dirt Pile with Naval Smoke Cans near INTEC

Because little is known about the presence of contaminants at MISC-45, soil samples will be collected to evaluate whether the soil at this site is contaminated with metal by-products that resulted from discharging the naval smoke pots. In addition, the Track 1 Decision Documentation Package for this site posed the possibility that the dirt pile was used as a vault for munitions, so the pile will be evaluated to ascertain whether unexploded ordnance is present or a vault is inside.

Four samples will be collected from soil around the smoke pots, and the samples will be analyzed for metals—specifically zinc, cadmium, lead, arsenic, and aluminum.

The dirt pile will be swept with a magnetometer to ascertain whether ferrous metal-containing material, such as ammunition, ordnance, or other objects, is present. The DQOs in the associated FSP identify contingencies for further invasive characterization if the magnetometer results indicate that there is substantial buried metal debris. In addition, the dirt pile will be hand-cored to ascertain whether it was

used as a storage location. Details of this sampling effort will be defined by the project DQOs, as discussed in the FSP (DOE-ID 2005).

4.3 TRA-62: Abandoned Discharge Pipeline between Building TRA-608 and the TRA-701 Chemical Waste Pond

No samples have been collected in association with Site TRA-62 specifically, but they were collected from the chemical waste pond (Site TRA-06), which this 6- to 7-ft-deep pipeline fed. That sampling revealed elevated concentrations of mercury, barium, manganese, zinc, and arsenic in the soil in the pond. Lead is also considered a COPC, because it is a common contaminant of industrial-grade sulfuric acid. Consequently, soil samples will be collected along the 600-ft length of the pipeline from a depth of 2 to 4 ft below the pipe and analyzed for metals, specifically those listed above. Because leakage from the pipeline would most likely have occurred at the joints, 10 sample locations will be selected at the locations of the joints. Excavations down to the pipeline in three locations will help to ascertain and verify the pipe's location, depth, direction, and joint spacing. Samples will be collected from the soil beneath the pipeline in the excavated areas at 10 ft below ground surface. The remaining samples will be collected from 10 ft below the ground surface using an auger at joint locations along the pipeline between the excavated areas. Details of this sampling effort will be defined by the project DQOs, as discussed in the FSP (DOE-ID 2005).

5. CONCEPTUAL SITE MODELS

The conceptual models for each site are shown in Figures 4 through 6. The models for these sites were created using the Track 2 investigation format.

6. PRELIMINARY DATA QUALITY OBJECTIVES

Preliminary DQOs, which are summarized in Table 1, have been developed after a review of the information and data available for each of the three sites. The DQOs are discussed further in the FSP (DOE-ID 2005).

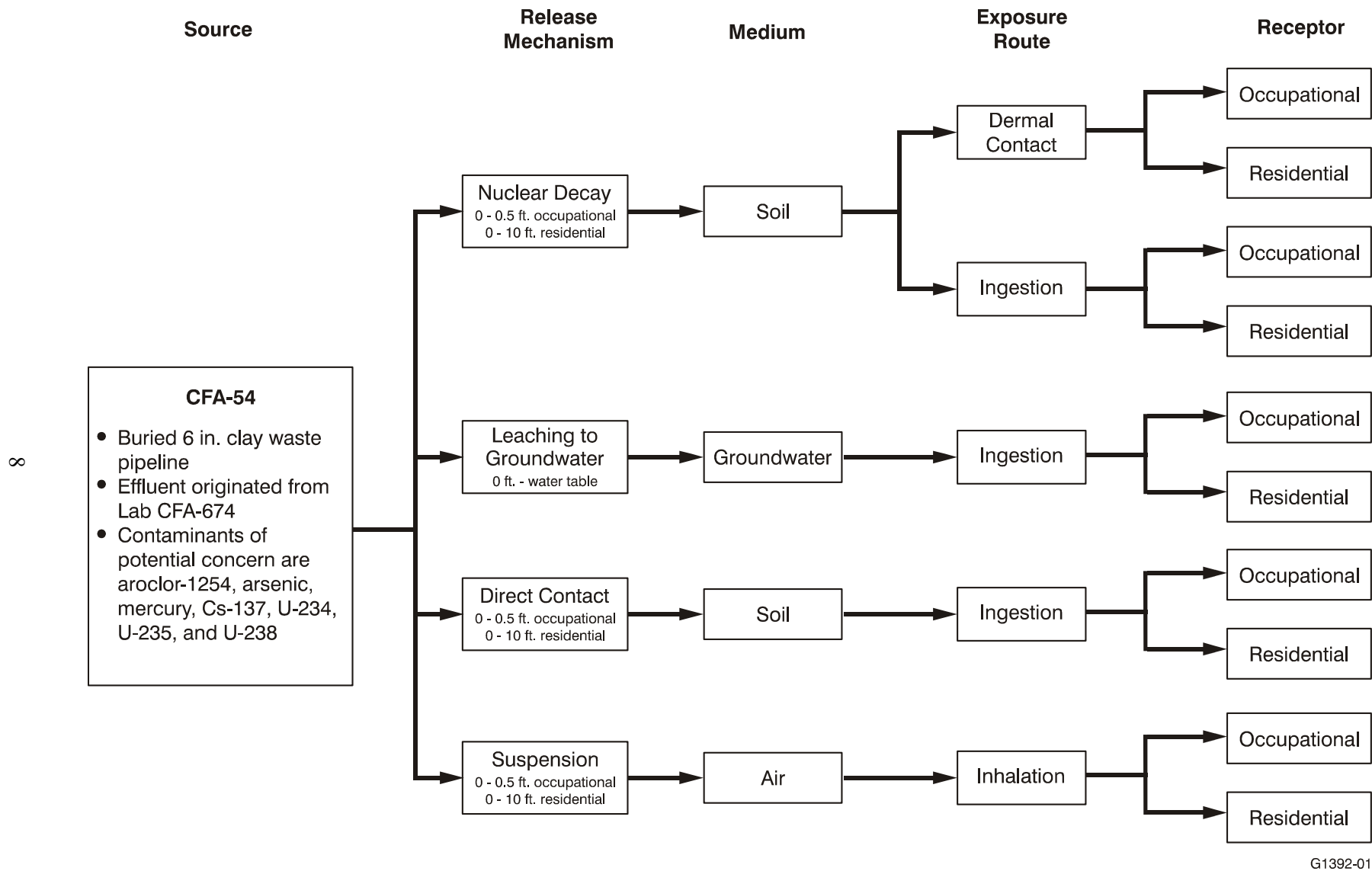
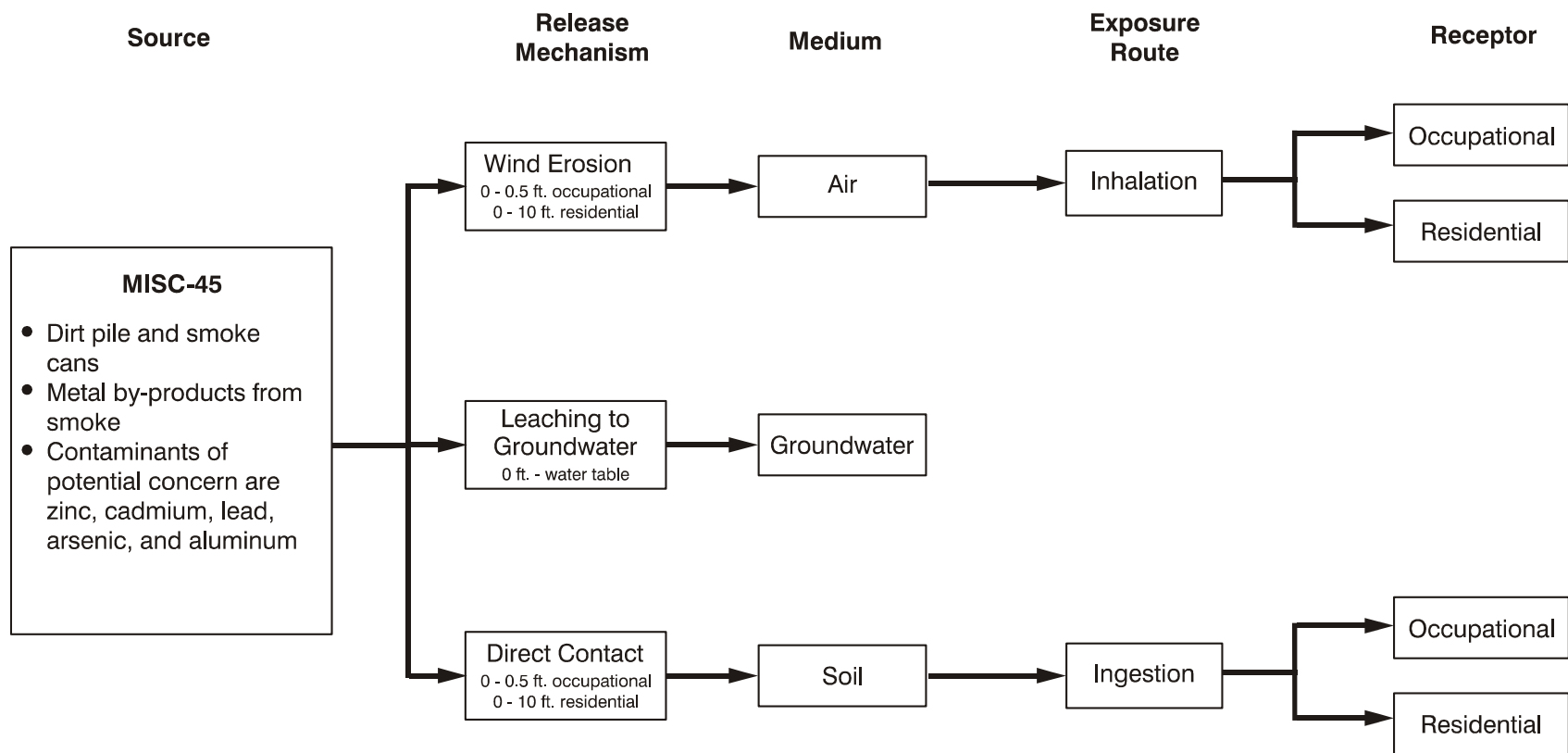
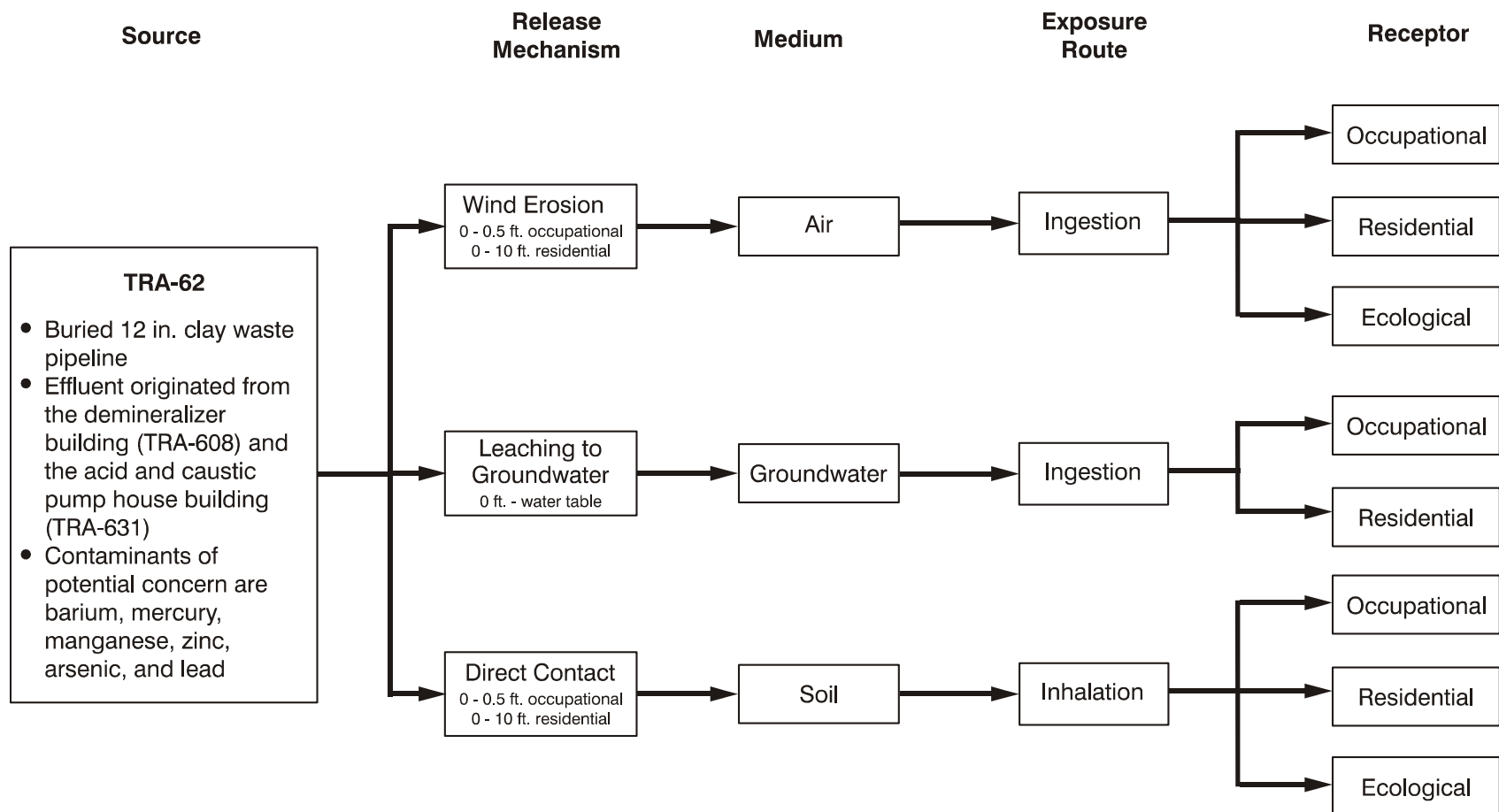


Figure 4. Conceptual site model for the buried waste pipe south of CFA-674 (Site CFA-54).



G1392-02

Figure 5. Conceptual site model for the dirt pile with naval smoke cans near INTEC (Site MISC-45).



G1392-03

Figure 6. Conceptual site model for the abandoned discharge pipeline between Building TRA-608 and the TRA-701 chemical waste pond (Site TRA-62).

Table 1. Preliminary DQOs.

DQO Elements	Buried Waste Pipe South of CFA-674 (Site CFA-54)	Dirt Pile with Naval Smoke Cans near INTEC (Site MISC-45)	Abandoned Discharge Pipeline (Site TRA-62)
Track 2 objectives	Determine the presence or absence of COPCs at this site. Determine the concentrations of aroclor-1254, arsenic, mercury, Cs-137, U-234, U-235, and U-238 in the soil around the pipe.	Determine the presence or absence of COPCs at this site. Determine the concentration of metals in the soil around the smoke pots and on the dirt pile, and determine whether unexploded ordnance is present within the pile.	Determine the presence or absence of COPCs at this site. Determine the concentration of mercury, barium, manganese, zinc, and arsenic in the soil around the pipeline.
Prioritized data uses	Determine the presence and concentration of COPCs at this site. Evaluate the risk level from potential contaminants at this site. Determine appropriate future actions.	Determine the presence and concentration of COPCs at this site. Evaluate the risk level from potential contaminants at this site. Determine appropriate future actions.	Determine the presence and concentration of COPCs at this site. Evaluate the risk to determine the appropriate controls needed at the site for the protection of human health and/or the environment. Determine appropriate future actions.
COPCs	Aroclor-1254, arsenic, mercury, Cs-137, U-234, U-235, and U-238	Zinc, cadmium, lead, arsenic, and aluminum	Barium, mercury, manganese, zinc, and arsenic
Reporting limits	Aroclor-1254: 0.0166 mg/kg Arsenic: 0.039 mg/kg Cs-137: 2.3 pCi/g U-234: 0.18 pCi/g U-235: 0.013 pCi/g U-238: 0.067 pCi/g Mercury: 2.3 mg/kg	Aluminum: 0.85 mg/kg Arsenic: 0.039 mg/kg Cadmium: 0.000236 mg/kg Lead: 0.0994 mg/kg Zinc: 0.329 mg/kg	Arsenic: 0.039 mg/kg Barium: 1.1 mg/kg Lead: 0.0994 mg/kg Manganese: 1.05 mg/kg Mercury: 2.3 mg/kg Zinc: 0.329 mg/kg
Critical samples	Critical samples are defined in the FSP (DOE-ID 2005).	Critical samples are defined in the FSP (DOE-ID 2005).	Critical samples are defined in the FSP (DOE-ID 2005).
Sample collection	Sample collection methods are defined in the FSP (DOE-ID 2005).	Sample collection methods are defined in the FSP (DOE-ID 2005).	Sample collection methods are defined in the FSP (DOE-ID 2005).

Table 1. (continued).

DQO Elements	Buried Waste Pipe South of CFA-674 (Site CFA-54)	Dirt Pile with Naval Smoke Cans near INTEC (Site MISC-45)	Abandoned Discharge Pipeline (Site TRA-62)
Sample analysis	Aroclor-1254: SW 846 Method 8202 Cs-137: gamma spectrometry U-234, -235, -238: alpha spectrometry Arsenic: SW 846 Method 6101B Mercury: SW 846 Method 7471A	Metals: SW 846 Method 6010B	Metals: SW 846 Method 6010B Mercury: SW 846 Method 7471A
Field screening	Not applicable	Not applicable	Not applicable
Data validation levels	Level A	Level A	Level A

7. DELIVERABLES AND SCHEDULE

Table 2 shows the deliverables for this Track 2 investigation.

Table 2. Track 2 deliverables and schedule.

Deliverable	Date
Submit draft SOW to regulatory agencies	February 14, 2005
Resolve regulatory agencies' comments on draft SOW	March 20, 2005
Submit final SOW to regulatory agencies	March 31, 2005
Submit draft FSP to regulatory agencies	March 10, 2005
Resolve regulatory agencies' comments on draft FSP	April 15, 2005
Submit final FSP to regulatory agencies	April 20, 2005
Finalize health and safety plan	March 30, 2005
Commence Track 2 field investigation	June 2, 2005
Finish Track 2 field investigation	August 1, 2005
Submit draft summary report to regulatory agencies	January 30, 2006
Resolve regulatory agencies' comments on draft summary report	March 10, 2006
Submit final summary report to regulatory agencies	March 18, 2006

8. REFERENCES

- Burns, D. E., 2000, "Dirt Pile with Naval Smoke Cans near INTEC (MISC-045)," New Site Identification (Form 435.36), May 2000.
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- DOE-ID, 1994, *Track 2 Sites: Guidance for Assessing Low Probability Hazard Sites at the INEL*, DOE/ID-10389, Rev. 6, U.S. Department of Energy Idaho Operations Office, January 1994.
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- DOE-ID, 2005, *Field Sampling Plan for Waste Area Group 10 Track 2 Investigation of Sites CFA-54, MISC-45, and TRA-62 (Draft)*, DOE/NE-ID-11224, Rev. 0, U.S. Department of Energy Idaho Operations Office, March 2005.

ICP, 2005, *Site TRA-62 Track 1 Decision Documentation Package, Operable Unit 10-08*, ICP/EXT-04-00588, Idaho Completion Project, February 2005.

Wilkinson, S. R., 2002, "Abandoned Discharge Lines, TRA-608 Area to TRA-701 Chemical Leach Pond (TRA-62)," New Site Identification (Form 435.36), March 2002.